

Chemistry Holiday Homework

With All diagrams, Observations, And everything!

Day wise from Day 1 to Day 20.

BYK

Day - 1

1. A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y. (a) Write the chemical formulae of X and Y. (b) Write a balanced chemical equation, when X is dissolved in water.

Answer:

(a) X is Magnesium Oxide (MgO), a white powder. Y is Magnesium Nitride (Mg₃N₂), formed when magnesium reacts with nitrogen.

b) When Magnesium Oxide dissolves in water, it forms Magnesium Hydroxide: $\text{MgO (s)} + \text{H}_2\text{O (l)} \rightarrow \text{Mg(OH)}_2 \text{ (aq)}$.

2. Explain chlor-alkali process. Why is it called so?

Answer: The chlor-alkali process is the electrolysis of an aqueous solution of sodium chloride (brine). It produces chlorine gas (chlor-), sodium hydroxide (alkali), and hydrogen gas. It is named 'chlor-alkali' due to the formation of chlorine and the alkaline sodium hydroxide product.

3. Write down observation of activity 1.1 from Ncert.

Answer: Magnesium ribbon burns with a dazzling white light and changes into a white powder. The white powder is magnesium oxide.

Day - 2

1. What is the chemical formula for washing soda? How can it be obtained from baking soda? Describe two applications of washing soda.

Answer: Washing soda's chemical formula is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. It is obtained by heating baking soda (sodium hydrogen carbonate) to form sodium carbonate, then recrystallizing it from water. Applications include cleaning agent for glass, soap industries, and removing permanent hardness of water.

2. Which among the following changes are exothermic or endothermic in nature? (a) Decomposition of ferrous sulphate (b) Dilution of sulphuric acid (c) Dissolution of sodium hydroxide in water (d) Dissolution of ammonium chloride in water.

Answer: (a) Decomposition of ferrous sulphate is endothermic. (b) Dilution of sulphuric acid is exothermic. (c) Dissolution of sodium hydroxide in water is exothermic. (d) Dissolution of ammonium chloride in water is endothermic.

3. Write down observation of activity 2.15 from Ncert.

Steps	Observation
Before heating	Blue crystals of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
During heating	Crystals turn white
After heating	Water droplets appear
After adding water	Crystals turn blue again

Day - 3

1. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

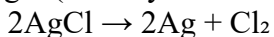
Answer:

Heat (Thermal Decomposition):



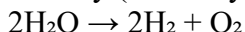
(Calcium carbonate \rightarrow Calcium oxide + Carbon dioxide)

Light (Photolytic Decomposition):



(Silver chloride \rightarrow Silver + Chlorine gas)

Electricity (Electrolytic Decomposition):



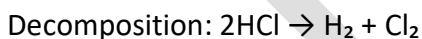
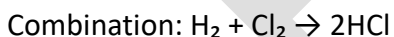
(Water \rightarrow Hydrogen gas + Oxygen gas)

2. Why decomposition reactions are called the opposite of combination reactions? Write equations for these reactions.

Answer:

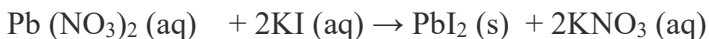
Decomposition reactions are called the opposite of combination reactions because they break down a compound into simpler substances, whereas combination reactions join simpler substances to form a compound.

Example:



3. Write down observation of activity 1.2 from Ncert.

After mixing the two solutions, we see a yellow precipitate of lead iodide formed.



Day - 4

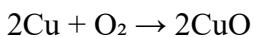
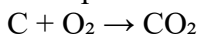
1. Explain the following in terms of gain and loss of oxygen with two examples each?

a. Oxidation b. Reduction.

Answer:

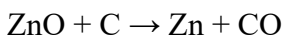
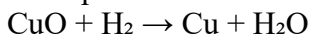
a. Oxidation: Gain of oxygen.

Examples:



b. Reduction: Loss of oxygen.

Examples:



2. Write down observation of activity 1.3 from Ncert.

When we add acid to zinc granules, we see the following

i. **Bubble formation:** - we can see effervescence around the zinc granules.

ii. **Temperature change:** - we can observe an increase in temperature by touching the conical flask.

iii. **Gas test:** - when we bring a burning matchstick near the mouth of the flask, we can hear a pop sound that indicates the hydrogen gas

3. Write down observation of activity 2.9 from Ncert.

1. A colourless gas is evolved.
2. There is no colour change in dry blue litmus paper.
3. Wet blue litmus paper turns red.

BYJU'S

Day - 5

1. (a) Define indicator. Name two indicators obtained from plants. (b) Write balanced chemical equation for the reaction that takes place when sodium oxide reacts with water. How will this solution behave towards phenolphthalein and red litmus paper? (c) State what happens when sodium hydroxide solution reacts with dilute hydrochloric acid. What is this reaction called?

Answer:

(a) An indicator changes color in acidic/basic solutions.

Example: Litmus, Turmeric.

(b) $\text{Na}_2\text{O (s)} + \text{H}_2\text{O (l)} \rightarrow 2\text{NaOH (aq)}$.

Solution is basic; phenolphthalein turns pink, red litmus stays red.

(c) Salt (NaCl) and water form. This is a neutralization reaction.

$\text{NaOH (aq)} + \text{HCl (aq)} \rightarrow \text{NaCl (aq)} + \text{H}_2\text{O (l)}$.

2. Write down observation of activity 1.4 from Ncert.

1. When water is added to calcium oxide, a vigorous reaction takes place.
2. A hissing sound is produced and a bubble can be seen.
3. The beaker becomes very hot which indicates the rise in the temperature.
4. A white solution is of slaked lime (calcium hydroxide)

Day - 6

1. (a) Define a universal indicator. Mention its one use. (b) Solution A gives pink colour when a drop of phenolphthalein indicator is added to it. Solution B gives red colour when a drop of methyl orange is added to it. What type of solutions are A and B and which one of the solutions A and B will have a higher pH value? (c) Name one salt whose solution has pH more than 7 and one salt whose solution has pH less than 7

Answer:

(a) Universal indicator shows different colors over pH range.

Use: check soil pH.

(b) A is basic, B is acidic. Solution A will have a higher pH.

(c) $\text{pH} > 7$: Sodium carbonate (Na_2CO_3).

$\text{pH} < 7$: Ammonium chloride (NH_4Cl).

2. Write down observation of activity 1.5 from Ncert.

Before Heating

The ferrous sulphate crystals are pale green.

During Heating

Ferrous sulphate crystals have water of crystallization that evaporates during heating so the crystals turn white.

After Heating

After continuous heating, the final residue is brown Ferric oxide (Fe_2O_3), and a pungent smell indicates the evolution of gases.

These gases are sulphur dioxide (SO_2) and sulphur trioxide (SO_3)

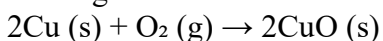
Day - 7

1. 1 g of copper powder was taken in a China dish and heated. What change takes place on heating? When hydrogen gas is passed over this heated substance, a visible change is seen in it. Given the chemical equations of reactions, the name and the colour of the products formed in each case.

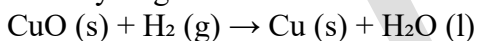
Answer:

Heating turns reddish-brown copper black (copper(II) oxide). Passing hydrogen over heated black substance turns it reddish-brown (copper) again.

Heating:



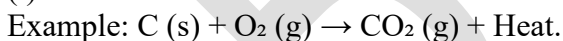
With hydrogen:



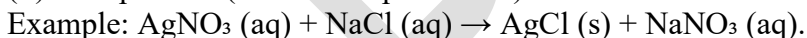
2. Identify the type of each of the following reactions. Also write balanced chemical equation for each reaction. (i) A reaction in which the reaction mixture becomes warm. (ii) A reaction in which an insoluble substance is formed.

Answer:

(i) Exothermic Reaction.



(ii) Precipitation (Double Displacement) Reaction.



3. Write down observation of activity 1.6 from Ncert.

Colour change – Initially, lead nitrate powder is white but on decomposition, a yellow residue is obtained.

Gas evolution—During heating, brown fumes emit from the tube, indicating gas evolution.

Nature of fumes – The brown fumes have a pungent smell that is characteristic of nitrogen dioxide gas.

BYJU'S

Day - 8

1. On heating blue coloured powder of copper (II) nitrate in a boiling tube, black copper oxide, O₂ and a brown gas X is formed. (a) Identify the type of reaction and the gas X. (b) Write balanced chemical equation of the reaction. (c) Write the pH range of aqueous solution of the gas X.

Answer:

(a) Decomposition reaction; Gas X is Nitrogen Dioxide (NO₂).

(b) $2\text{Cu}(\text{NO}_3)_2 (\text{s}) \rightarrow 2\text{CuO} (\text{s}) + 4\text{NO}_2 (\text{g}) + \text{O}_2 (\text{g})$
(on heating)

(c) Aqueous solution of NO₂ is acidic, so its pH range is less than 7.

2. Write down observation of activity 1.7 from Ncert.

Bubbles of gases appear above the electrodes in both test tubes.

When a burning candle is brought near test tube A(containing H₂ gas), it burns with a popping sound and extinguishes.

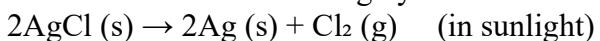
When the burning candle is brought near test B(containing O₂ gas), it burns more brightly.

Day - 9

1. 2 g of silver chloride is taken in a China dish and the China dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction.

Answer:

White silver chloride turns greyish-white due to metallic silver formation.



This is a photolytic decomposition reaction.

2. You are provided with three test tubes A, B and C which contain distilled water, acidic solution and basic solution respectively. If you are given blue litmus paper only, how will you identify the contents of each test tube?

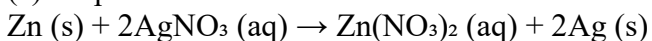
Answer: Dip blue litmus: turns red in acid (A). Use this red litmus: turns blue in base (B). Remaining is distilled water (C). This sequential testing identifies all three solutions.

Day - 10

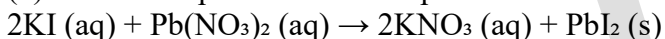
1. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions. (a) Zinc reacts with silver nitrate to produce zinc nitrate and silver. (b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide.

Answer:

(a) Displacement reaction:



(b) Double Displacement / Precipitation reaction:



2. Write one point of difference between each of the following: (i) A hydrated salt and an anhydrous salt (ii) Washing soda and soda ash (iii) Baking soda and Baking powder

Answer: (i) Hydrated salt contains water of crystallization ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$); anhydrous salt does not (CuSO_4). (ii) Washing soda is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$; soda ash is anhydrous Na_2CO_3 . (iii) Baking soda is pure NaHCO_3 ; baking powder is a mixture of NaHCO_3 and a mild edible acid.

Day - 11

1. In electrolysis of water, why is the volume of gas collected over one electrode double that of gas collected over the other electrode?

Answer: Water (H_2O) decomposes into hydrogen (H_2) and oxygen (O_2). The chemical formula shows two hydrogen atoms for every one oxygen atom. Thus, hydrogen gas collected at the cathode is double the volume of oxygen gas collected at the anode, maintaining the 2:1 ratio.

2. What is observed when a solution of potassium iodide is added to a solution of lead nitrate taken in a test tube? (i) What type of reaction is this? (ii) Write a balanced chemical equation to represent the above reaction

Answer: A bright yellow precipitate of Lead(II) Iodide (PbI_2) forms.

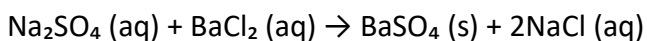
(i) This is a Double Displacement (Precipitation) Reaction.

(ii) $2\text{KI (aq)} + \text{Pb(NO}_3)_2 \text{ (aq)} \rightarrow \text{PbI}_2 \text{ (s)} + 2\text{KNO}_3 \text{ (aq)}$.

Day - 12

1. What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride? State the physical conditions of reactants in which reaction between them will not take place. Write the balanced chemical equation for the reaction and also mention the type of reaction.

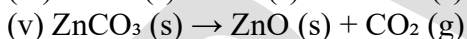
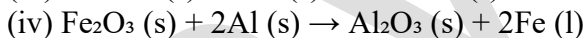
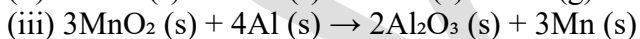
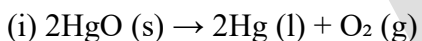
Answer: A white precipitate of barium sulphate (BaSO_4) forms along with sodium chloride. The reaction won't occur if the reactants are solid.



This is a Double Displacement (Precipitation) reaction.

2. Write balanced chemical equations to explain what happens, when (i) Mercuric oxide is heated. (ii) Mixture of cuprous oxide and cuprous sulphide is heated. (iii) Aluminium is reacted with manganese dioxide. (iv) Ferric oxide is reduced with aluminium. (v) Zinc carbonate undergoes calcination

Answer:



Day - 13

1. (a) Define corrosion. What name is given to the corrosion of iron? (b) Name the colour of coating formed on silver and copper articles, when exposed to air? (c) List two damages caused by corrosion and suggest how corrosion can be prevented.

Answer: (a) Corrosion is material deterioration by environmental reactions. Iron corrosion is rusting. (b) Silver: black (silver sulphide); Copper: green (basic copper carbonate). (c) Damages: weakens structures, damages vehicles. Prevention: painting, oiling, galvanizing, electroplating, alloying.

2. Write down observation of activity 1.8 from Ncert.

When silver chloride is placed in the sunlight. Colour of silver chloride changes.

3. Write down observation of activity 2.8 from Ncert.

Through this activity, we observe that –

1. The bulb glows in the case of both acids.
2. The bulb does not glow, and glucose and alcohol solution do not conduct electricity.

Day - 14

1. You might have noted that when copper powder is heated in a China dish, the reddish brown surface of copper powder becomes coated with a black substance. (a) Why has this black substance formed? (b) What is this black substance? (c) Write the chemical equation of the reaction that takes place. (d) How can the black coating on the surface be turned reddish brown?

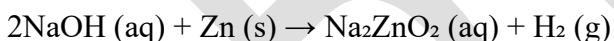
Answer:

- (a) Formed due to copper's oxidation by atmospheric oxygen.
- (b) Copper(II) Oxide (CuO).
- (c) $2\text{Cu (s)} + \text{O}_2 \text{ (g)} \rightarrow 2\text{CuO (s)}$
- (d) Pass hydrogen gas over heated CuO, reducing it back to reddish-brown copper.

2. 2 ml of sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube. When the contents are warmed a gas evolves which is bubbled through a soap solution before testing. Write the equation of the chemical reaction involved and the test to detect the gas. Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid?

Answer:

Reaction:



Test:

'Pop' sound with burning splinter (H_2).

Gas evolved with strong acid is also Hydrogen (H_2).

3. Write down observation of activity 2.7 from Ncert.

- 1. Copper oxide is a black-coloured powder.
- 2. It turns blue-green after reacting with HCl
- 3. No gas is evolved during the chemical reaction

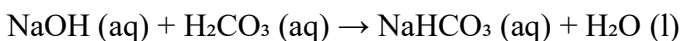
Day - 15

1. Identify the acid and base which form sodium hydrogen carbonate. Write chemical equation in support of your answer. State whether this compound is acidic, basic or neutral. Also write its pH value.

Answer:

Acid: Carbonic acid (H_2CO_3)

Base: Sodium hydroxide (NaOH)



Sodium hydrogen carbonate is basic, with a pH value usually around 8–9.

2. List the important products of the Chloralkali process. Write one important use of each.

Answer:

Products:

Chlorine gas (Cl_2) – water treatment

Sodium Hydroxide (NaOH) – soap manufacturing

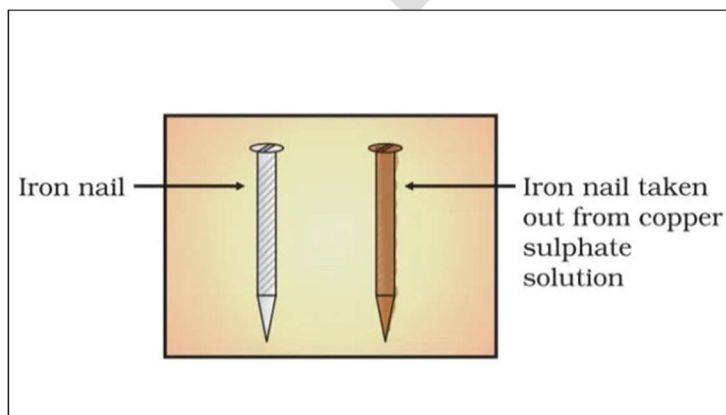
Hydrogen gas (H_2) – fuel

These are vital industrial chemicals.

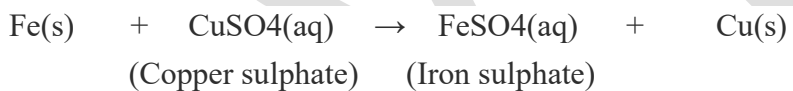
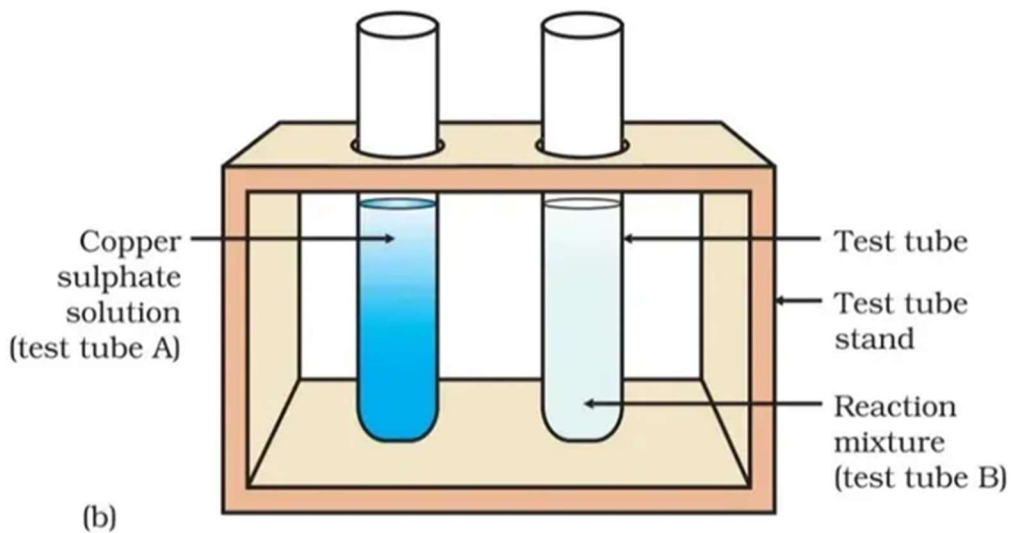
3. Write down observation of activity 1.9 from Ncert.

After 20 minutes we take out both the nails from test tube B.

Now we compare both nails with the nail kept aside, and we find the iron nail that remained suspended has a brownish coating on its surface.



we also find that the blue colour of the copper sulphate solution fades and changes to light green colour which is different from the colour of the copper sulphate solution in test tube A.



In the above reaction, iron displaces copper from the copper sulphate solution.

Day - 16

1. How is sodium hydroxide manufactured in industries? Name the process. In this process a gas X is formed as by-product. This gas reacts with lime water to give a compound Y, which is used as a bleaching agent in the chemical industry. Identify X and Y and write the chemical equation of the reaction involved.

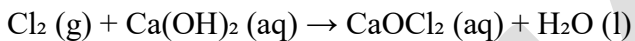
Answer:

Sodium hydroxide is manufactured by the Chlor-alkali process.

Gas X is Chlorine (Cl_2).

Compound Y is Bleaching Powder (CaOCl_2).

Reaction:



Y is used as a bleaching agent.

2. Write down observation of activity 1.10 from Ncert.

A double displacement reaction occurs between sodium sulphate and barium chloride.

An insoluble white solid substance forms. This solid substance is barium sulphate.

3. Write down observation of activity 2.6 from Ncert.

On adding phenolphthalein to NaOH solution, the solution turns pink, but colour disappears on adding a few drops of HCl to it. When NaOH solution is added again to this test tube, the pink colour reappears.

BYJU'S

Day - 17

1. (a) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid? (b) Dry hydrogen chloride gas does not change the colour of dry litmus paper why?

Answer: (a) Acid dilution is highly exothermic. Adding acid to water slowly dissipates heat, preventing violent boiling and splashing. Adding water to acid concentrates heat, causing dangerous reactions. (b) Dry HCl gas doesn't ionize to produce H^+ ions without water, which are essential for acidic properties and litmus color change.

2. Write down observation of activity 1.11 from Ncert.

Copper powder (reddish brown) is heated in a china dish, it turns black copper oxide.

Day - 18

1. List two observations which you make when you add a pinch of sodium hydrogen carbonate to acetic acid in a test tube. Write chemical equation for the reaction that occurs.

Answer:

Observations: Brisk effervescence (gas evolution) and the solution becomes transparent.

Reaction:



2. Two solutions A and B have pH values of 3.0 and 10.5 respectively. Which of these will turn: (i) Blue litmus solution to red and (ii) Phenolphthalein from colourless to pink? Justify your answer in each case.

Answer: (i) Solution A (pH 3.0) will turn blue litmus red because it is acidic. (ii) Solution B (pH 10.5) will turn phenolphthalein colorless to pink because it is basic. Acids turn blue litmus red; bases turn phenolphthalein pink.

3. Write down observation of activity 2.1 from Ncert.

After performing the activity we can observe the colour changes that are given in the table.

Sample	Blue litmus solution	Red litmus solution	Phenolphthalein	Methyl Orange
<i>HCl, HNO₃, H₂SO₄</i>	Changes to red	No colour change	Colourless	Changes to red
<i>NaOH, Ca(OH)₂, KOH, Mg(OH)₂, NH₄OH</i>	No change	Change to blue	Change to light pink	Change to yellow

Day - 19

1. While studying the combination reaction on adding water to quick lime, name the product formed and write its colour.

Answer: When water is added to quick lime (CaO), Slaked Lime (Calcium Hydroxide, Ca(OH)_2) is formed. It is a white suspension/solution, and the reaction is highly exothermic, releasing significant heat.

2. While studying the decomposition reaction by heating ferrous sulphate crystals in a test-tube, a product is formed in the test-tube. Name the product and write its colour.

Answer: Upon heating green ferrous sulphate crystals ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$), they decompose. The solid product formed in the test-tube is Ferric Oxide (Fe_2O_3), which is a reddish-brown solid. Gases like SO_2 and SO_3 are also evolved.

3. Write down observation of activity 2.2, 2.3 from Ncert.

Activity 2.2 Observation –

In the above activity the following observations have been observed-

Onion: Onion has a peculiar smell due to the presence of Sulphurous allium. The smell of onion diminishes in a base because it reacts like acid and remains as it is in acid.

Vanilla essence: Vanilla has a pleasant odour due to the presence of an aldehyde and this is a weak acid so the odour of vanilla essence disappears when it is added to a base. The odour of vanilla essence persists when it is added to an acid.

Clove Oil: In bases, its characteristic smell cannot be detected.

Test	Effect of Acids (HCl)	Effect of Base(NaOH)
Onion-soaked cloth strip	No significant change in odour	Smell disappears
Vanilla essence	Smell disappears	No change
Clove oil	No change	Smell disappears

Activity 2.3 Observation - When we bring a burning candle near a gas-filled bubble the gas burns with a popping sound.

BYJU'S

Day - 20

1. Write five physical properties of each :- (i) Metals (ii) Non - Metals

Answer: (i) Metals: Lustrous, malleable, ductile, good conductors of heat/electricity, solid at room temperature (except Hg), sonorous. (ii) Non-Metals: Non-lustrous, brittle (if solid), poor conductors of heat/electricity, exist as solids/liquids/gases, non-sonorous.

2. Name the following (i) Metal which is liquid at room temperature (ii) Most Ductile metal (iii) Most malleable metal (iv) Non metal which is good conductor of electricity (v) Non metal which is liquid at room temperature

Answer: (i) Mercury (Hg). (ii) Gold (Au). (iii) Gold (Au). (iv) Graphite. (v) Bromine (Br). These are specific examples highlighting unique properties of metals and non-metals.

3. Write down observation of activity 2.4, 2.5 from Ncert.

Activity 2.4 Observation - We can see bubbles on the surface of zinc granules. A gas is evolved in the reaction between zinc and sodium hydroxide solution.

Activity 2.5 Observation –

1. both test tubes, effervescence (bubbling) is observed when HCl is added.
2. When the gas is passed through lime water, it turns milky white in both cases.